

Claims

[Claim 1]

A stacked-chip semiconductor device comprising:
an interposer substrate; and
5 a plurality of semiconductor chips overlaid two tiers
deep or more and mounted on said interposer chip, wherein
at least one of said semiconductor chips comprises a
plurality of through-wires, and at least one voltage
selected from power supply voltage and ground is fed from
10 said interposer substrate by way of said through-wires to
said at least one of said semiconductor chips.

[Claim 2]

A stacked-chip semiconductor device comprising:
an interposer substrate;
15 a first semiconductor chip that is disposed above said
interposer substrate and that has a thick-film wiring and a
circuit surface on an upper surface;
a second semiconductor chip that is disposed above said
first semiconductor chip and that has a plurality of
20 through-wires and a circuit surface on an upper surface;
a plurality of bumps for providing an electrical
connection between said plurality of through-wires and said
thick-film wiring; and
bonding wires for electrically connecting said
25 interposer substrate and said thick-film wiring, wherein
at least one voltage selected from power supply voltage
and ground is fed from said interposer substrate to the
circuit surface of said second semiconductor chip by way of

said bonding wires, said thick-film wiring, said plurality of bumps, and said plurality of through-wires.

[Claim 3]

A stacked-chip semiconductor device comprising:

5 an interposer substrate;

a first semiconductor chip that is disposed above said interposer substrate and that has a thick-film wiring and a circuit surface on an upper surface;

10 a second semiconductor chip that is disposed above said first semiconductor chip and that has a plurality of through-wires and a circuit surface on a lower surface;

a plurality of bumps for providing an electrical connection between said second semiconductor chip and said thick-film wiring; and

15 bonding wires for electrically connecting said interposer substrate and said thick-film wiring,

wherein a power supply voltage and ground are fed from said interposer substrate to the circuit surface of said second semiconductor chip by way of said bonding wire, said

20 thick-film wiring, and said plurality of bumps; and

electrical signals are transmitted between said interposer substrate and the circuit surface of said second semiconductor chip by way of said plurality of through-wires and said bonding wires.

25 [Claim 4]

The stacked-chip semiconductor device according to claims 2 or 3, wherein the thickness of said thick-film wiring is the same as the height of said plurality of bumps.

[Claim 5]

The stacked-chip semiconductor device according to claim 4, wherein said thick-film wiring and said plurality of bumps are formed by plating.

5 [Claim 6]

A stacked-chip semiconductor device comprising:

an interposer substrate;

a first semiconductor chip that is disposed above said interposer substrate and that has a plurality of through-wires;

a second semiconductor chip that is disposed above said first semiconductor chip and that has a circuit surface on a lower surface;

15 a plurality of first bumps for electrically connecting said plurality of through-wires and said interposer substrate; and

a plurality of second bumps for electrically connecting said plurality of through-wires and said second semiconductor chip,

20 wherein at least one voltage selected from power supply voltage and ground is fed from said interposer substrate to the circuit surface of said second semiconductor chip by way of said first bumps, said thick-film wiring, and said second bumps.

25 [Claim 7]

A stacked-chip semiconductor device comprising:

an interposer substrate;

a first semiconductor chip that is disposed above said

interposer substrate and that has a circuit surface on an upper surface and a thick-film wiring;

5 a spacer that is disposed above said first semiconductor chip and that has a plurality of through-wires;

a second semiconductor chip that is disposed above said spacer and that has a circuit surface on a lower surface;

a plurality of first bumps for electrically connecting said plurality of through-wires and said thick-film wiring;

10 a plurality of second bumps for electrically connecting said plurality of through-wires and said second semiconductor chip; and

bonding wires for electrically connecting said interposer substrate and said thick-film wiring,

15 wherein at least one voltage selected from power supply voltage and ground is fed from said interposer substrate to the circuit surface of said second semiconductor chip by way of said bonding wires, said thick-film wiring, said first bumps, said plurality of through-wires, and said second bumps.

20 [Claim 8]

A stacked-chip semiconductor device comprising:

an interposer substrate;

25 a first semiconductor chip that is disposed above said interposer substrate and that has a plurality of first through-wires;

a spacer that is disposed above said first semiconductor chip and that has a plurality of second

through-wires;

a second semiconductor chip that is disposed above said spacer and that has a circuit surface on a lower surface;

5 a plurality of first bumps for electrically connecting said interposer substrate and said first through-wires;

a plurality of second bumps for electrically connecting said first through-wires and said second through-wires; and

a plurality of third bumps for electrically connecting said second through-wires and second semiconductor chip,

10 wherein at least one voltage selected from power supply voltage and ground is fed from said interposer substrate to the circuit surface of said second semiconductor chip by way of said first bumps, said first through-wires, said second bumps, said second through-wires, and said third bumps.

15 [Claim 9]

A stacked-chip semiconductor device comprising:

an interposer substrate;

20 a first semiconductor chip that is disposed above said interposer substrate and that has a circuit surface on an upper surface and thick-film wiring;

a second semiconductor chip that is disposed above said first semiconductor chip and that has a plurality of through-wires;

25 a third semiconductor chip that is disposed above said second semiconductor chip and that has a circuit surface on a lower surface;

a plurality of first bumps for electrically connecting said plurality of through-wires and said thick-film wiring;

a plurality of second bumps for electrically connecting said plurality of through-wires and said second semiconductor chip 2; and

5 bonding wires for electrically connecting said interposer substrate and said thick-film wiring,

wherein at least one voltage selected from power supply voltage and ground is fed from said interposer substrate to the circuit surface of said third semiconductor chip by way of said bonding wires, said thick-film wiring, said first 10 bumps, said plurality of through-wires, and said second bumps.

[Claim 10]

The stacked-chip semiconductor device according to any of claims 1 to 9, wherein a plurality of wires for each said 15 semiconductor chip for feeding said power supply voltage and ground are disposed in parallel for each said semiconductor chip, and are each connected in parallel to a single wire within said interposer substrate, within said semiconductor chip, or within said spacer.

20 [Claim 11]

The stacked-chip semiconductor device according to any of claims 1, 2, and 6 to 9, wherein a signal is also transmitted, in addition to at least one said power supply voltage and ground, by way of said through-wires.